CHAPTER - III
THE PRESENT STUDY

3.1 Choice of the present work:

Until recently Goalpara district remains as a botanically un-explored area though it has rich floral diversity with wide range of habitat diversity. Not only Goalpara but various parts of the state of Assam still botanically remain underexplored or unexplored due to various constraints. As such as detail flora of the state of Assam is still lacking. The flora of British India by Hooker et al., (1872 - 1897), Flora of Assam by Kanjilal et al., (1934 - 1940) still remain as the only reference works on the flora of the state. Subsequent to the publication of Hooker and Kanjilal the political boundary as well as the flora of Assam have been changed due to numerous factors. Moreover, the Flora of Assam by Kanjilal et al., has its own limitations.

However, some works on vegetation of the state (Das, 1942 ; Rao and Panigrahi 1961 ; Rajkhowa, 1961 ; Bhatnagar, 1963 ; Das and Rajkhowa, 1968 and Rao, 1974) have been published and during the last 10 - 12 years some floristic lists on small areas of the state have also appeared.

Due to various developmental activities, the forest flora of the district of Goalpara have depleted to a considerable extend. Therefore, it is imperative to record the floral biodiversity of the district to access the floristic wealth of the district.

Besides basic information about plant species a detail inventory of plant wealth is essential for fuller exploitation of plant resources of an area and this is particularly true for a backward district like Goalpara.

It is with the objective to prepare the inventory of phytodiversity of the district that the present work was taken up. Considering the number of species and richness of the flora of North-Eastern India only dicotyledonous plants were taken into consideration to have an exhaustive comprehensive account. The present work is also designed to find out the endangered and endemic elements in the flora of the district.

3.2 Field and herbarium methods:

The study has three components.

(i) Field survey: Collection trips were made in different parts of the district covering hills, forests, beels, tributaries, etc. As far as possible field works were carried
out in different seasons. Urpod, Hashila, Kumri beels; Paglatek, Srisuiya, Hulukanda, Rakhyashini hills; Salpara, Dabli, Borjhar, deosiya, Daraka, Lakhipur, Pancharatna, Krishnai forest areas (Map-5) were thoroughly explored and herbarium specimens were collected.

Survey were carried out in almost all parts of the district covering different habitats, forest types. During the survey plant specimens were collected and herbarium materials were prepared following standard herbarium techniques (Jain and Rao 1977). In the field, apart from transient characters of the plants, notes on habitat association, etc., were recorded.

(ii) **Identification**: The collected specimens have been made into herbarium specimens. Preliminary identifications were made with the help of literature and subsequently confirmed in ASSAM Herbarium (BSL.) at Shillong, Central National Herbarium at Calcutta (CAL) and Herbarium of Botany Department, G.U.

(iii) **Preparation of the flora**: The flora have detailed accounts of species with keys to species, genera, families and short description of dicotyledonous plants available in the area. Following the rules of latest ICBN, nomenclature of species were determined along with important synonyms. Vernacular names, phenology, distributional notes, notes on associations, etc have been included. Photographs, drawings of some rare and endangered and interesting specimens are incorporated in the work.

3.3 **Accounts on vegetation of Goalpara district**:

The vegetation of the Assam region has been studied by a number of workers (Griffith 1847; Hooker 1872 - 1897, 1904; Kanjilal et al. 1934 - 40; Sengupta 1937; Das 1942; Rowntree 1953; Kingdon Ward 1960; Rao and Panigrahi 1961; Rajkhowa 1961; Bhatnagar 1963; Das and Rajkhowa 1968; Rao 1974; Rao 1978). Based on these studies the vegetation of the district can be classified as follows -


(i) **Semi evergreen forest**: This type of forest is characterised by dense and impenetrable vegetation comprising of tall trees showing storied nature. The top storey consists of some of the important timber species such as *Dipterocarpus macrocarpus*, *Terminalia chebula*, *Tetrameles nudiflora*, *Ailanthes grandis*, *Shorea robusta*. 
The middle storey is represented by small trees and shrubs like *Mesua ferrea* *Toona ciliata*, *Amoora wallichii*, etc. In moist areas these forests are often interspersed by bamboo species such as *Dendrocalamus hamiltonii*, *Bambusa pallida*, *Melocanna bambusoides*, etc.

The lower storey is characterised by *Ficus glomerata*, species of *Garcinia*, *Sterculia*, *Phoebe*, *Magnolia*, *Litsea*, *Alangium* together with a number of smaller trees of the higher storeys.

The trees in this type of forests are bestowed with innumerable climbers and lianas, chief among them are *Calamus floribundus*, *Caesalpinia bouduc*, *Hodgsonia macrocarpa*, *Pothos scandens*, *Merremia umbellata*.

There is a profusion of epiphytic species heavily clothing the tree trunks and branches. The chief among them are – *Hoya parasitica*, *Pothos scandens*, *Schefflera venulosa*, *Dendrobium aphyllum*, *Rynchostylis retusa*, *Vanda roxburghii*, etc.

Some parasitic plants are also seen to grow in these types of vegetation. Mention may be made of – *Cuscuta reflexa*, *Viscum monoicum*, *Dendrophthoe falcata* etc.

The ground flora comprises the major portion of the flora of the district. Besides angiospermic plants it is also comprises of many ferns and fern-allies like – *Lygodium flexuosum*, *L. japonicum*, *Angiopteres evecta*, species of *Diplazium*, *Lycopodium*, *Selaginella*, etc.

Semi evergreen forests are more widely spread in the foot hill areas in the north of the district. *Som* (*Persia bombycina*), *Outenga* (*Dillenia indica*), *Titasopa* (*Michelia champaca*), *Nahor* (*Mesua ferrea*), *Gomari* (*Gmelina arborea*), *Hilikha* (*Terminalia chebula*), *Azar* (*Lagerstroemia indica*), *Bohera* (*Terminalia bellirica*), *Simalu* (*Bombax ceiba*), *Oxy* (*Dillenia pentagyna*), *Makrisal* (*Schima wallichii*), *Jamu* (*Sizygium fruticoso*) are some of the prominent plant species growing in the semi-evergreen forests of Goalpara.

(ii) **Sal forests**: Large areas in the district are covered by Sal (*Shorea robusta*) trees. The important associated species of Sal are Makri-sal (*Schima wallichii*), *Som* (*Persia bombycina*), *Dingdinga* (*Oroxylum indicum*), *Azar* (*Lagerstroemia indica*), *Larubandha* (*Alangium chinense*), *Mallotus philippinensis*, *Macaranga denticulata*, etc.
(iii) **Swamp vegetation**: This type of vegetation extends over the whole district in perennial stagnant water bodies, lakes, beels etc. Aquatic angiospermic herbs like *Euryale ferox*, *Nymphaea nouchali*, *Nelumbo nucifera*, *Trapa natans* var. *bispinosa*, *Eichornia crassipes*, *Ludwigia octavulvis*, *Polygonum spp.*, etc are too much common in the water bodies of the district. *Ranunculus scleratus*, *Monochoria hastata*, various species of *Cyperus*, *Ludwigia adscendens*, *Ipomoea carnea*, *I. aquatica*, *Utricularia flexuosa*, *Commelina benghalensis*, etc. Mention may be made about *Maranta dichotoma* (Marantaceae) i.e. the so called "Pati" plant basing on which the "Pati" industries are seen to be grown in some parts of the district. From here different type of "Pati" are supplied to different parts of the country.

*Azolla pinnata*, *Ceratopteris thalictroides*, *Salvinia cucullata* and *S. natans All.* are the common fern species in stagnant water bodies, such species often form pure colonies. In places, where soil is sandy and saturated with water *Equisetum spp.*, *Marsilea minuta* L. form extensive cover (Borthakur et al. 2000).

(iv) **Mixed deciduous forest**: The main species of this type of forest are *Steculia vilosa*, *Lagerstroemia indica*, *Grewia polycarpa*, *Terminalia belerica*, *Albizia lucida*, *Cassia fistula*, *Bombax ceiba*, *Oroxylum indicum*, *Toona ciliata*, *Ficus glomerata*, *Melia azadirach*, *Ficus sylhetensis*, *F. benghalensis*, *F. religiosa*, *Spondius pinnata*, *Holarrhena antidysenterica*, etc.

(v) **Grass land vegetation**: The grass land can be classified into two types. The one in ripariam flats, which are inundated every year during the rains and remain under water for considerable period. The other in comparatively drier areas, which often in certain areas represents seral community. The main component species of grasses in riparian flats are *Saccharum spontaneum*, *Arundo donax*, *Phragmites karka*, *Erianthus munja*, etc.

District is also rich by grasslands. In drier areas the grasses are hardy and smaller, common among them are - *Imperata cylindrica*, *Cyperus spp.*, *Paspalum spp*, *Paspalidium spp*, *Echinocloa spp*, etc. Other dicotyledonous trees, shrubs or herbs available in this type of grass land are *Leea asiatica*, *Crotalaria pallida*, *Mimosa pudica*, *Grewia polycarpa*, *Terminalia belerica*, *Zyzyphus mauritiana*, *Macaranga denticulata*, *Bombax ceiba*, etc.
Some grasses are seen to grow near river banks which are inundated every year and remain under water for a considerable period, e.g. *Arundo donax*, *Phragmites karka*, *Saccharum spontanium*.

(vi) **Mixed bamboo forests**: One of the characteristic features of vegetation in Assam is the occurrence of bamboo either in pure patches or in association with other trees, it also holds good in case of bamboo vegetation of Goalpara district. *Dendrocalamus hamiltonii* usually occur in almost pure patches in semievergreen and deciduous forests with a few standing trees here and there.

This district is also rich in minor species such as bamboo, cane and reeds which are of considerable economic importance. Different bamboo species seen to occur generally in the hilly areas of the district. Common among them are *Dendrocalamus hamiltonii*, *Bambusa pallida*, *B. nutans*, *B. tulda*, etc.

**3.4. The present account**: In the present account an attempt has been made to display the whole dicotyledonous plant species in a lucid way which are available in the district of Goalpara. In this work Bentham and Hooker's system of classification was followed with little modification. In the taxonomic treatment artificial keys to the families, genera, species were prepared. The detailed description of each species were worked out from live or herbarium specimen and by consulting literature. The genera under each family and the species under each genus are arranged alphabetically.

The nomenclature of each and every genus and species were made by consulting current literature (Bennet 1987). In describing each species first its nomenclature including Assamese name was given which is followed by descriptions of the species. Phenology, distributional notes, notes on associations have also been included, finally author's reference of the specimen was mentioned clearly. Drawings, photographs of some species are also incorporated in the work.